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this one has been so reported. It is to be hoped that such dangerous action will not prove chronic with the brilliant and beautiful Hemiptera.——Professor C. V. Riley was awarded a gold medal by the Forestry Exhibition at Edinburgh, in October, for the collection of insects injuring forest trees sent out by the Entomological Division of the Department of Agriculture.

ZOÖLOGY.

THE MOLLUSCAN BODY-CAVITY.—The molluscan forms in general are unlike most of the other metazoan groups in having or seeming to have no body-cavity, the spaces between their organs being filled up with branched cells forming a parenchymatous mass. This fact has led the Hertwig brothers to subdivide the Metazoa above Cœlenterates into two groups, animals with a true body-cavity lined with epithelial cells, including annelids, arthropods and vertebrates, and animals with no such cavity, but with a pseudo-body-cavity of lacunar spaces among amœboid-shaped cells, including Polyzoa, rotifers, plathelminths and Mollusca. Zoölogists generally have been disinclined to accept the view that the parenchymatous tissues of the mollusk are at all comparable with the body-cavity of annelids, etc., and prefer to consider these body-spaces of the mollusks a vastly increased mesodermal mass that has encroached upon the true epithelial-lined body-cavity and greatly reduced its proportions.

It is a constant feature of true body-cavities that they stand in direct communication with the exterior through organs usually excretory in function but also often reproductive. In the Mollusca the pericardium is in direct communication with the exterior through the organ of Bojanus, the molluscan kidney. This has been observed and described in a very large number of Lamellibranchs. Cunningham has recently shown that the kidney in Aplysia[1] and in Patella[2] has openings into the pericardium. Sedgwick has shown the same for Chiton. It has, therefore, been suggested on many sides that in the molluscan pericardium we have the remains of a body-cavity, but shrunken here to very small dimensions. Upon this view the very characteristic form of the molluscan kidney and pericardium becomes intelligible.

In a paper by Von Ihring[3] we are informed that there is a further relation between the renal organs and the generative system which is of interest. We are taught that in the mollusks the genital organs are shut off from the renal system, and open to the exterior by a special duct directly continuous with the organ. This is very unlike the animals with a body-cavity, for in them the genital organs very generally are related to the body-cavity

[1] *Mitt. Zool. Stat. Neapel*, Vol. IV, p. 420.

[2] *Quart. Jour. Mic. Sci.*, July, 1883,

[3] *Zeitschr. f. w. Zool.*, XXIX, p. 583.

and to the renal organs. Von Ihring's studies show that in some mollusks there is a direct relation between the renal organs and the genital organs. In the lamellibranchs he found that the kidneys are paired pouches opening to the exterior by paired orifices, that the genital organs are likewise paired pouches, that there are three modes by which these open to the exterior:

1. By a distinct orifice distinct from the renal orifice of the same side. This is the common mode, and was observed by Von Ihring in Tridacna, Isocardia, Seripes, Cardium, Gastrochæna, Mya, Cosbicula, Donax, Psammobia, Venus.
2. By a distinct orifice situated upon the same papilla with the renal orifice of the same side, *e. g.*, Mytilus.
3. By an orifice directly into the renal pouch of the same side, *e. g.*, Modiola, Modiolaria, Mytilus, Yoldia, Avicula, Isognomon, Margaritifera, Pecten, Spondylus.

There is here then ground for supposing that the genital system as well as the renal system may have stood in relation with the pericardial cavity in the early molluscan forms.

Hubrecht[1] describing Proneomenia states that the duct from the reproductive organ runs straight through the pericardium, and is in communication with it, and that in Chætoderma there is also a communication between the generative and pericardial cavities, and that this is the remnant of a primitive condition, and is similar in its meaning to the condition of things in Patella and Fissurella where renal and genital system open on some papilla, while in most gastropods even this slight indication of a previous closer relation is lost.

The morphology of these organs has been recently further illuminated by Grobben,[2] who has just published a paper upon the renal and genital systems and body-cavity of mollusks. This paper contains many interesting and suggestive thoughts, but the important results as far as they concern my present purpose may be summarized as follows:

1. In *Sepia officinalis* there is a pair of kidney sacks, with epithelium strongly glandular where these occupy the region of the body where the hearts and main vascular trunks are situated, and these kidney sacks open to the exterior by proper papillæ. A ciliated opening leads into this kidney sack from a cavity lined with ciliated epithelium; this cavity contains the gill hearts, the aortic heart and the genital organs. The ovary is a ridge in this cavity formed of folds of peritoneal epithelium, and ova are developed from its cells. Eggs from it are caught up by the open end of an oviduct and conveyed through it to the mantle cavity.
2. In *Eledone moschata* the peritoneal space is not large as in Sepia, and does not surround the hearts, it is small and little

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[1] *Proneomenia sluiteri, Quart. Journ. Micros. Sci.*

[2] Claus' Arbeiten, Vol. v, p. 179.

more than a reproductive organ, its walls being almost completely occupied by the folds which give rise to the ova. But it is most important to observe that a narrow tubular channel runs from it into the kidney sack opening, then by a ciliated mouth and lined with ciliated epithelium.

Grobben in his article states the obvious conclusions that this reproductive organ of the cephalopod is the remnant of a body-cavity, and that in the vast majority of existing Mollusca we have, as the sole surviving portion of the primitive body-cavity of the Mollusca, the pericardium, the renal organs and the genital glands.

Grobben promises a future paper with the details fully described and figured, upon the subject of this communication. It promises to be a most important contribution.

In the light of these facts it would seem that the separation of the Mollusca from the animals with true body-cavity, as is done by the Hertwigs, is not justified, for though their body cavity is at present insignificant, it would seem that this is due to the loss of the same and an early condition of greater likeness to the enterocœls rather than to an essential unlikeness reaching back to the earliest ancestor.—*Henry Leslie Osborn.*

NOTE ON THE PELVIS IN BIRDS AND DINOSAURS.—By the papers of Hulke[1] and Marsh[2] a new light was given upon the morphology of the pelvis in birds and dinosaurs. That part in birds previously considered as pubis was now the postacetabular part of this bone, the real pubis was seen on the "pectineal process" (Huxley). This preacetabular part of the pubis was called "pubis," the postacetabular portion "postpubis." This view seems generally adopted to-day.

I have recently had occasion to examine the pelvis of young chickens, quails and ducks, and I find that the "pectineal process" does not belong to the pubis; this process forms a part of the ilium. Bunge[3] has the same opinion, and lately this point has been discussed by Dollo.[4]

Notwithstanding that Dollo found correctly that the "pectineal process" belongs to the ilium, he homologizes it with the pubis, believing that this process was formerly distinct. "En effet, cellecié dans un organe rudimentaire, pourraît être ossifiée *par usurpation* directement avec l'ilium" (p. 95).

Farther he considers the pubis and postpubis of the dinosaurs forming originally two distinct elements. "Il résulte de tent ce que nous verrons de dire que le *pubis* et le *post-pubis* seraient primitivement des éléments séparés et que, *seuls*, les Dinosauriens et les Oiseaux persideraient ce dernier" (p. 97). I can only agree on the last point with Dollo.

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[1] *Hulke, T. W.* Appendix to "Note on a modified form of Dinos. ilium hitherto reputed scapula." Quart. Journ. Geol. Soc., Vol. XXXII, pp. 364–366, Aug., 1876.

[2] *Marsh, O. C.* Princ. charac. of Am. Jur. Dinos. Pars. I, XII, *Am. Journ. Sci. and Arts*, Nov., 1878, Jan., 1879. *Marsh, O. C.* Odontornithes. 1880.

[3] *Bunge, Al.* Untersuchungen zur Entwicklungsgeschichte des Beckengürtels der Amphibien, Reptilien und Vögel. Dorpat, 1880.

[4] *Dollo, M. L.* Troisième note sur les Dinosauriens de Bernissart. Bull. du Mus. roy. de Belgique, Tome II, 1883.

Sabatier[1] has figured the pelvis of a young *Casuarius galeatus*. In this specimen the line which separates the ilium and the pubis crosses the "pectineal process;" the upper half belongs to the ilium, the lower one to the pubis. This I think affords a solution to the problem.

The upper part of the "pectineal process" forming a part of the ilium, corresponds to the whole "pectineal process" of the Carinatæ and to that part of the dinosaurian ilium which articulates with the pubis; the lower part is homologous with the pubis of the dinosaurs, which has become quite rudimentary in the Carinatæ.

With this interpretation the researches of Miss Johnson[2] agree, though only partially, for she considers the pectineal process of the chicken as the pubis. She found in embryos of the chicken a well-developed preacetabular part of the pubis, which she homologizes with the pubis of dinosaurs. This is quite true for the lower and anterior part, but we can only detect in the upper part elements of the pectineal process, *i. e.*, elements of the ilium. A sharp line between the ilium and pubis at this time of development cannot be drawn, for both the ilium and the pubis consist of a single cartilaginous mass.

It is interesting to trace the development of the postpubis in the series of dinosaurians and birds. The oldest dinosaurs, as also the carnivorous forms, have no postpubis. In the Sauropoda it begins to appear (Camarasaurus, Mososaurus, Atlantosaurus), and in the Stegosauria it is well developed. In the Ornithograda it shows still a greater development; at the same time the pubis gets shorter; in the Ratitæ there is only a small part of the pubis to be seen; in the Carinatæ (whether in *all* is still a question) it is quite rudimentary, whilst the postpubis has become greatly developed.

	Carn. Dinos.	*Saurop.*	*Stegos.*	*Ornithop.*	*Rat.*	*Carin.*
Pubis	well developed.	well devel.	well devel.	well develop. Reduction beginning (Iguanodon).	very small lower part of pect. proc.	quite rudimentary.
Postpubis . .	wanting.	begins to appear.	well devel.	well devel.	well devel.	very much developed.
Ischium . .	larger than postpubis.	larger than postpubis.	a little larger than postpubis.	larger than or equal to postpubis.	equal to or smaller than postpubis.	smaller than postpubis.

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[1] *Sabatier, N.* Comp. des Ceint. et des Membres antèr. et postèr. dans la série des Vertébrés. Montpellier, 1880. Mém. de l'Acad. des Sciences et Lettres (Sect. des Sciences, tom. IX, 1880, Pl. VI, Fig. I.

[2] *Johnson A.* On the development of the pelvic girdle and skeleton of the hind limb on the chick. Quart. Jour. Micr. Soc., Vol. XXIII, new series, Pl. XXVI and XXVII, 1883.

From this table it will be seen that the carnivorous Dinosaurs stand in *no direct* genetic connection with the birds. There is no "postbubis" in the carnivorous Dinosaurs; these forms seem to become extinct in the Cretaceous, leaving no descendants.

In the herbivorous Dinosaurs and especially in the ornithopod-like forms we must seek for the ancestry of birds, and evidently that of the Ratitæ, the Carinatæ being thus considered as descending from the Ratitæ. It is not at all evident that Archæopteryx belongs in the carinate line as Dames believes.—*Dr. J. G. Baur, Yale College Mus., New Haven, Conn., October, 1884.*

THOMASOMYS, A NEW SUBGENERIC TYPE OF HESPEROMYS.—We have been greatly interested in the progress of Mr. Oldfield Thomas's studies of South American Muridæ—a difficult group on which we think this author has succeeded in throwing much needed light. His latest paper, a valuable one upon Jelski's Peruvian collection (P. Z. S. June 17, 1884), divides the unwieldy genus Hesperomys into the following groups: Rhipidomys, Oryzomys, Calomys, Vesperimus, Onychomys, Scapteromys, Phyllotis, Habrothrix and Oxymycterus. Mr. Thomas's arrangement shows "that the name Calomys is restricted to the small group to which it was originally applied by Waterhouse; that Oryzomys, which was hitherto supposed to include only two North and Central American species, really contains the great mass of the South American vesper-mice to which Calomys has been commonly applied; and that the range of Dr. Coues's subgenus Vesperimus extends down as far south as Peru, since it contains the two species *H. cinereus* and *H. taczanowskii*, formerly placed by me with much doubt in Rhipidomys, but which I now think must either be referred to Vesperimus or be made the type of a new subgenus" (l. c., p. 450).

Having lately, through Mr. Thomas's courteous attentions, been able to inspect these two species in the British Museum, we incline to the latter alternative, and accordingly propose the above subgeneric name, based upon the following characters: Form stout. Pelage copious. Tail about as long as head and body, hairy, but annuli distinctly visible. Soles perfectly naked. Ears hairy inside. Front upper and front lower molar each with six cusps, three on a side, opposite one another. Mammæ six. Habits monticoline. Type, *Hesperomys cinereus* Thos. Dedicated to Oldfield Thomas, Esq., assistant dept. of mammals, Br. Mus.—*Elliott Coues, Washington, D. C.*

AN EGG-LAYING MAMMAL.—Without doubt the most valuable zoölogical discovery of the past year was the announcement made to the British Association, at Montreal, in a telegram from Australia, that Mr. W. H. Caldwell, who went there for the purpose of studying the development of some of the curious animals found there, had discovered that the Monotremata are oviparous, and that the egg is meroblastic. No statement, says *Science*, was given in the telegram as to whether the observations related to the duck-bill (Ornithorhynchus), or to the spiny ant-eater (Echidna); but the main points of interest are the discovery of the oviparous habits of a mammal and the meroblastic development of its egg, as occurs in reptiles, since the eggs of mammals are, as embryologists would say, regularly protoblastic. This shows, says the reporter, that we must turn to the reptiles for the ancestors of the mammals.

THE AMERICAN BADGER IN OHIO.—Last summer there appeared in our local papers several sensational articles about a so-called "ghoul," which was robbing the graves and devouring the dead in some village or villages in Wood county.

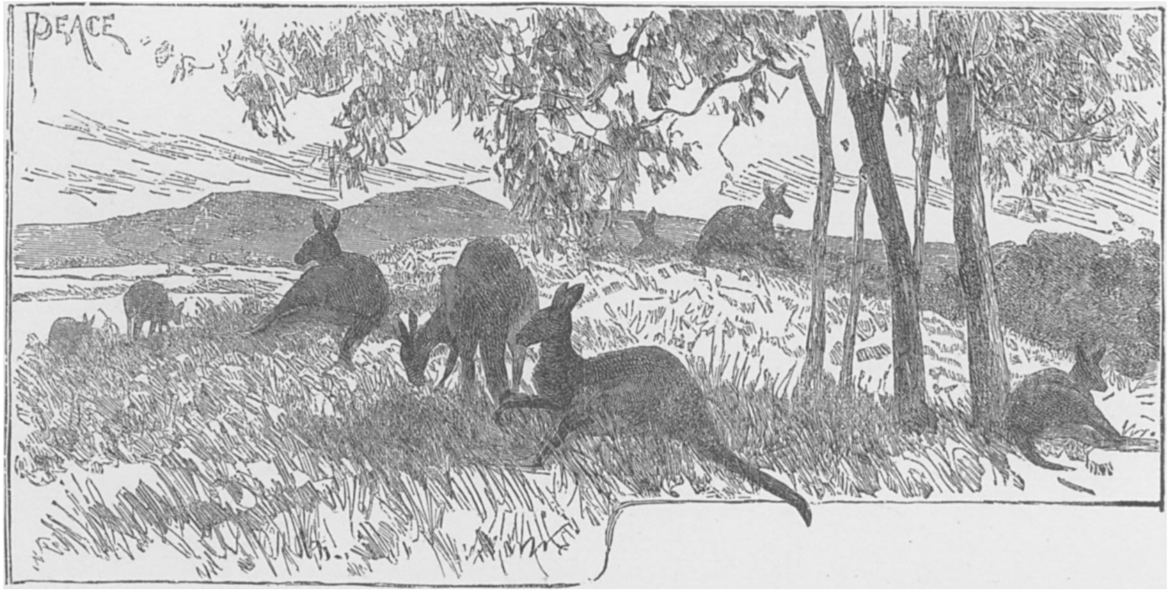
I did not, of course, pay much attention to these wonderful stories; but some time after noticing them I saw outside a beer saloon on one of our principal streets a placard to the effect that the "Wood county ghoul or grave-robber," was to be seen within. The man inside informed me that many people had been to see the strange creature, but no one knew exactly what it was, but the best informed pronounced it a nondescript animal hitherto unknown. A single glance sufficed to show that it was a fine and unusually large specimen of the American badger, *Taxidea americana.*

The poor beast had been caught in a large steel bear-trap, and had lost one of his fore feet. He seemed quite docile and contented except when the keeper stirred him up with a stout club, when he snarled viciously, and displayed enormous strength.

I thought that perhaps the capture of a badger in Ohio, where it has long been believed to be extinct, might be a matter of some interest. His burrowing among the soft earth of the new-made graves, is in accordance with its well-known subterranean habits; and the story of its devouring the dead is in strict accordance with the mental characteristics of a rural population, though of course destitute of any foundation in fact. The rarity of the animal hereabouts is evident enough from the failure of the numerous persons, hunters and others, who saw it to identify it. —*J. H. Pooley, M.D., Toledo, Ohio, Oct. 22, 1884.*

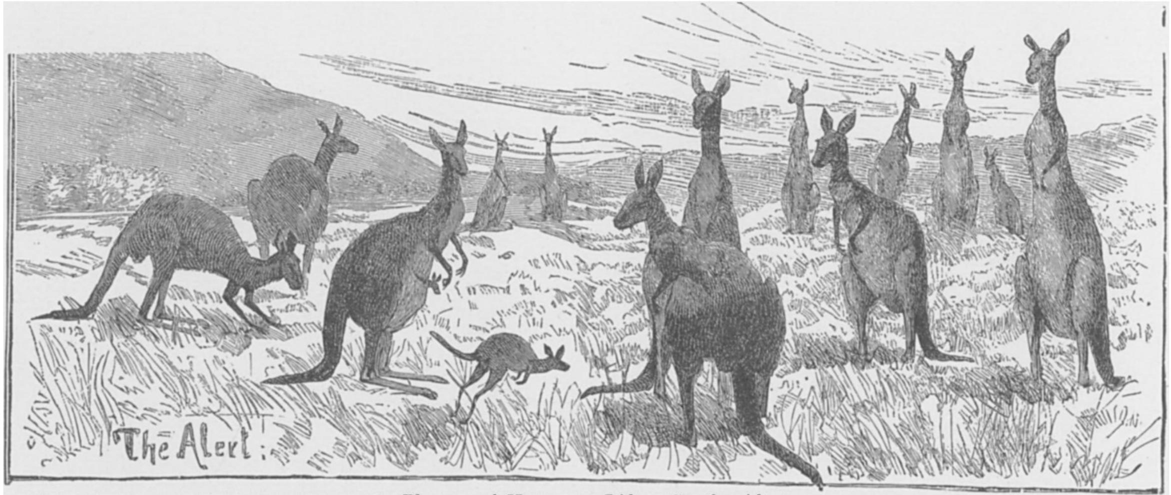
PHASES OF KANGAROO LIFE. — The accompanying series of sketches, says the *Illustrated Sydney News*, serve to illustrate three particular phases of marsupial life, so to term them. In its wild state there is perhaps no animal more timid than the kangaroo, and in proportion to its natural timidity it possesses the acute sense of hearing. When grazing in mobs they are constantly on the alert against surprise from their greatest natural enemies, the dingo and the Australian black, whose cunning in stalking them is marvelous. What means they possess of communicating approaching danger to one another is of course a mystery, but

PLATE XXXIX.



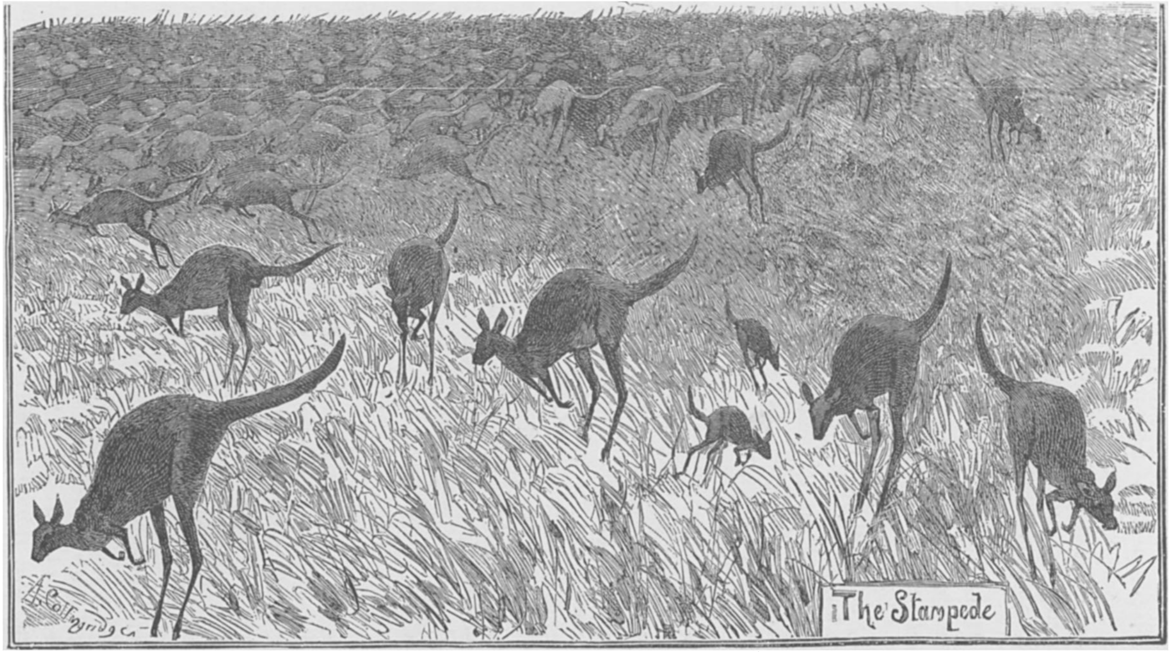
Phases of Kangaroo Life. At Peace.

PLATE XL.



Phases of Kangaroo Life. On the Alert.

PLATE XLI.



Phases of Kangaroo Life. The Stampede.

apparently the alarm usually is given by the warning animal striking the ground violently with its hind foot. The mob at once rear themselves up and sniff for the source whence danger is supposed to be approaching. The "joeys," as the young ones are called, cling to the backs of their mothers, and if very young secrete themselves in the pouches, and, led by some "old man" warrior, a stampede takes place. We are indebted to the *Scientific American* for the use of these illustrations.

HABITS OF THE GORILLA.—The gorilla recently shipped to Philadelphia and now in the possession of Professor Cope, was shot in the Ogowé delta, on the left bank of the main channel of the Ogowé river, near a place called "Orângâ" (the deep), about fifty miles in a direct line from the Atlantic ocean. Gorillas are not found on the right hand of the Ogowé, at least not near the river, but from the left bank all the way to the coast.

The great Ogowé delta, following the windings of the river, is 165 miles in length and perhaps ninety miles wide at the widest part. The upper part contains many red clay hills, one at least being 600 feet in height. Excepting these, the land is low, most of it being just below the flood line. The lowest land is covered either with coarse grass—the food of hippopotami and manati—or papayers. The higher lands and hills are covered with a dense forest or jungle of palm and other trees. The gorilla seems to be attracted to this region by two particular kinds of wild fruit of which he is very fond. He is always found in the wildest, darkest and most secluded parts of the forest, and greatly dislikes the presence of man. When aroused he is brave, and fights with great fury. He is so feared but very few men have the nerve to hunt him, especially as it is necessary to let him come within a few (twelve is the rule) feet before firing, owing to the darkness of the jungle. The man who shot this one was looked upon with wonder and admiration by all the people, every one of whom believed he was possessed of a powerful fetich or he could not have killed him. The entrails were given to some Pangwe (cannibals, the Fans of Du Chaillu and the Niam Niam of Schweinfurth) who esteemed them a great delicacy, and the universal opinion here is, that I sent him to America for the white man to eat. They were greatly disgusted with my wasting so much good rum on him when they would liked to have poured it down their throat so well. The gorilla is a rare animal even in that part of the country where he makes his home, and opportunities to obtain specimens occur but seldom. Old males, as this one, live alone, while as many as two families are seldom, at least, seen together. Many wonderful stories of them are told by the natives, but as one never knows how much to believe of native stories I will not repeat them here. In my opinion Du Chaillu is the best living authority on gorillas. I would believe his statements even if they conflicted with my own observations, because he understands them better than I do . It may be interesting to note that the people here look upon them as entirely distinct from themselves, yet they call them men, "wild men" and "furrent men."

The gorilla cannot make a fire, does not build a house or shelter, and does not fight with weapons except such as nature gives him in his own body. He will seize the gun or spear of his adversary and break but will not attempt to use it in his own defence. It is about practically impossible to keep the gorilla for any length of time in captivity. He becomes dejected and morose, and either starves himself or else dies apparently of a broken heart. Traders and others occasionally get young ones—I had one myself—but they do not seem happy as do chimpanzees and other apes, and they all die in the course of a few weeks. I do not suppose an opportunity to obtain another body will occur again, if it should I will send it to you. With kindest regards I remain as ever—*Joseph H. Reading, Kângwe Mission Station, Ogowé river, West Africa.*

ZOOLOGICAL NOTES.—*General.*—The British Museum has recently published as a separate volume a report on the zoölogical collections made in the Indo-Pacific during the voyage of H. M. S. *Alert*, 1881–'82. More than three-fourths of the volume is occupied by an account of the species found in Northeastern Australia and Torres straits. Examination of the specimens of Branchiostoma affords Dr. Günther an opportunity to revise that genus, of which he admits six species. The report describes many new Mollusca, four new asteroids, four new ophiuroids and six new holothurians. Most of the twenty-seven or twenty-eight kinds of crinoids are new, and so are forty-five of the 203 Crustacea described. Twelve species of fixed alcyonarians and forty-two out of 110 kinds of sponges are described as new. Though eighty-six of the sponge species are siliceous, none of them belong to the Hexactinellidæ. Among the new forms from the Western Indian ocean are *Turtur coppingeri* (named after Dr. Coppinger, the naturalist of the expedition). A considerable number of rare or undescribed forms of Crustacea were procured at the Amirante, Providence and Glorioso islands, and twenty one new sponges are described.

Mollusca.—As a result of a series of investigations carried on at Banyuls and at the Ecole Normale, M. Houssay comes to the conclusion that there is no homology between the operculum of the Gastropoda and the byssus of the Acephala, and none between the operculum of the former and the second valve of the latter group. The operculum is an epithelial production of a corneous or calcareous structure, while the byssus is the product of a gland situated in the anterior part of the foot. This foot-gland of the Acephala is represented in a large number of gastropods by a gland in the same position, but a longitudinal furrow is added in the Acephala. Every operculum is formed of the same layers, the one produced at the posterior part of the columellar muscle, while the other is laid down upon this, thickening it upon the inferior side. Sometimes a third layer is present.

Crustacea.—The thesis which has gained for M. F. Mocquard the title of "doctor" of sciences, describes the stomach of the Podophthalmia, its motor muscles and nerves. The gastric skeleton presents a special type in each family. The brachyura have a narrow and triangular mesocardiac piece, and lengthened horizontal pterocardiac pieces, while in the macrura the mesocardiac calcification occupies the entire breadth of the upper cardiac wall, while the pterocardiac pieces are generally short and almost vertical. The gastric skeleton of the anomoura proves that some are macrura and other brachyura. While with rare exceptions the gastric skeleton of the brachyura follows the tolerably uniform type, that of the macrura presents wide variations. The schizopods and stomapods present the same calcifications as the decapods, but the lateral teeth, which are rudimentary in the Squillidæ, are well developed in the schizopods. The latter have also as their special character the absence of pyloric ampullæ, while the squillæ are peculiar in the pyramidal form of the cardiac division of the stomach. The same calcifications persist through the entire range of the Podophthalmia, that is, although they may change in form, coalesce, or occasionally disappear, no additional pieces are ever found. Guided by the characters of these parts, M. Mocquard divides the Grapsoidea into two groups, one consisting of the Ocypodidæ, the other including Gelasimus, etc., and the Pinnotheres. From his study of the muscles our author has discovered that when in use the median tooth of the stomach works into the angle made by the approach of the anterior extremities of the lateral pieces, while the uro-cardiac calcification serves to retain the aliments in the required position.

Fishes.—Mr. Gilbert has been studying the fishes of White river, Indiana, and of Kansas, and finds a few new species. Among these former is the long unrecognized *Hybopsis tuditanus* Cope, which has been placed in a new genus by Professor S. A. Forbes, on account of the separation of the small dorsal spine from the rays by a membrane as in Pimephales. It is called Hypargyrus. He also states that Hyborhynchus cannot longer be distinguished from Pimephales.——Professor D. S. Jordan has been studying the fishes of the Gulf of Mexico and of the West Indies, and has written a number of important monographs of various Percomorph genera.——Professor Gill has been adding to our knowledge of the osteology of fishes, particularly of the Anacanthini and of the Plectognathi. All the above articles appear in the proceedings of the U. S. National Museum.